Jet Propulsion Laboratory
California Institute of Technology

What is Team X?

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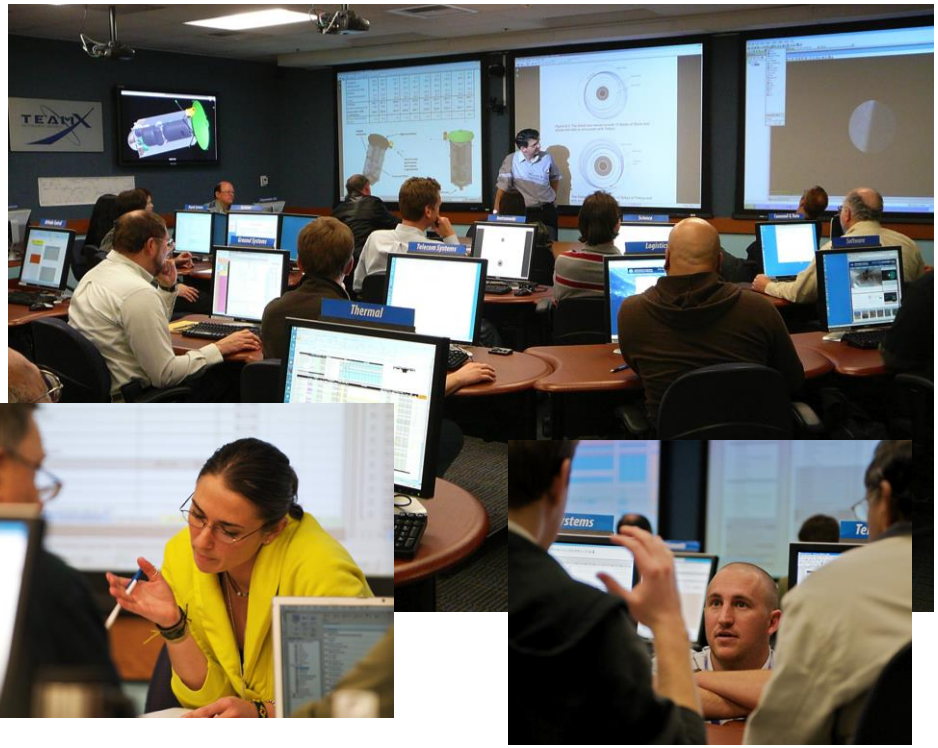
What is Team X?

Team X is a concurrent engineering team for rapid design and analysis of space mission concepts

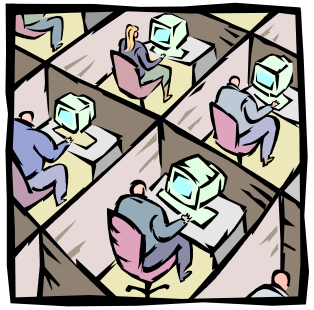


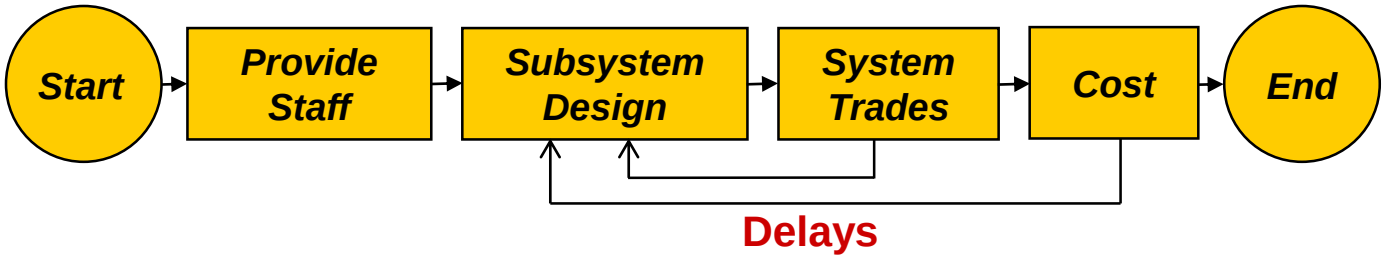
- Developed in 1995 by JPL to reduce study time and cost
- More than 1100 studies completed
- Institutionally endorsed
- Emulated by many institutions

Team X profiled in *Time* magazine, October 2005

Concurrent Engineering – What is it?

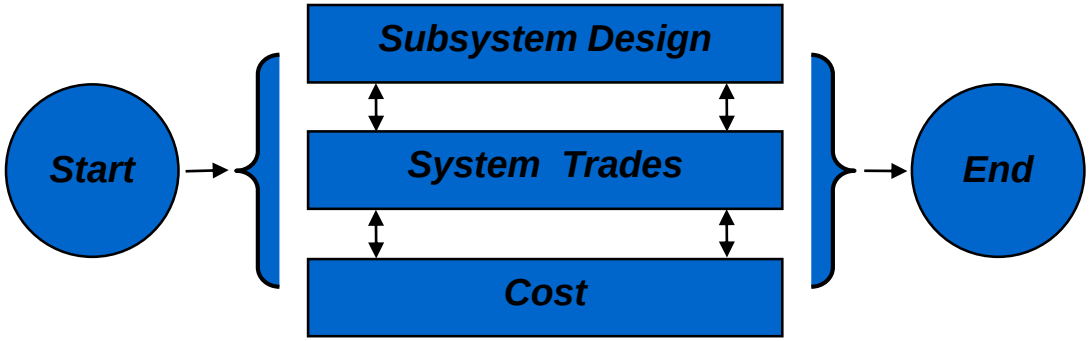
Traditional Method – Serial





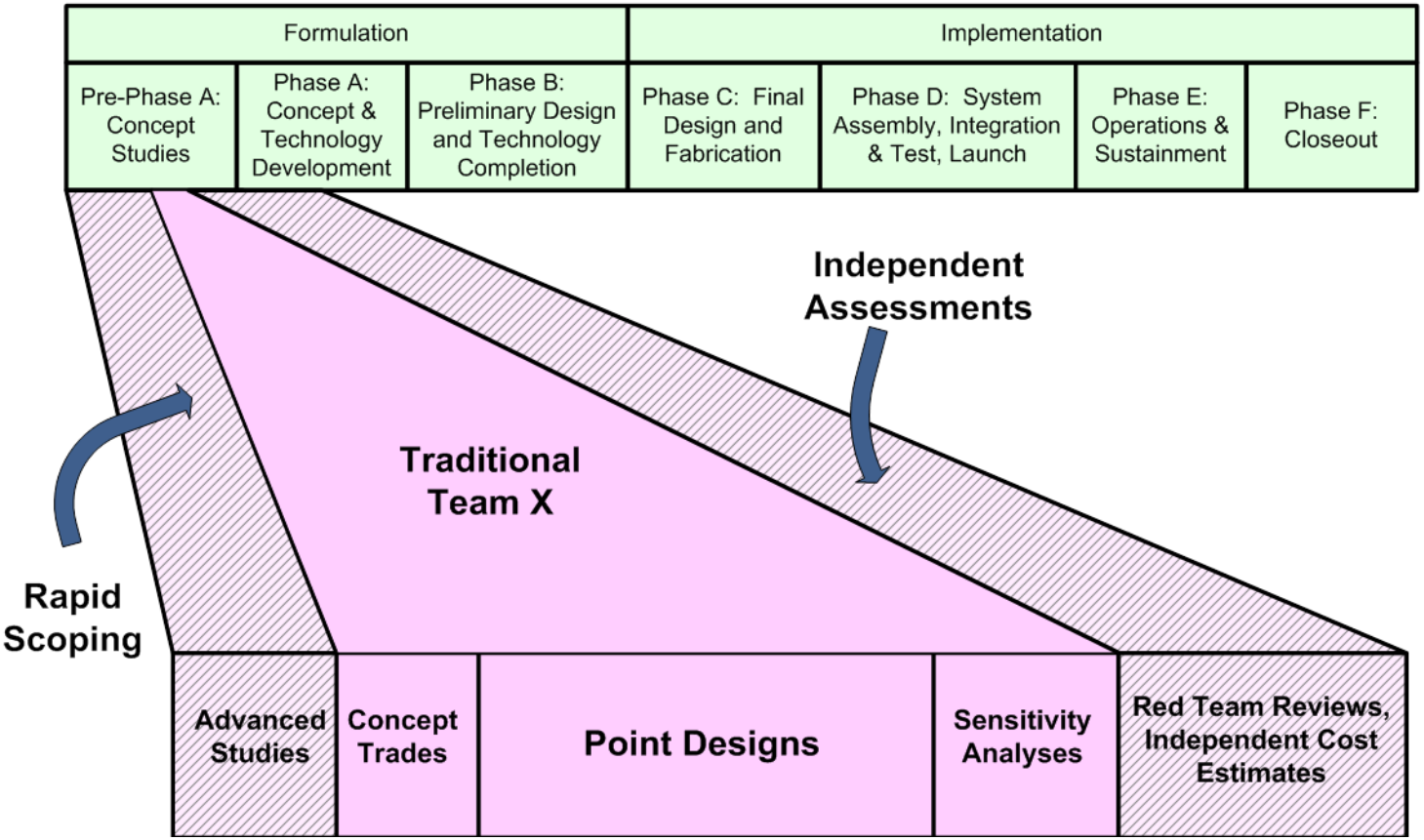
Concurrent Engineering – Parallel

- Diverse specialists working in real time, in the same place, with shared data, to yield an integrated design



Applicability at JPL

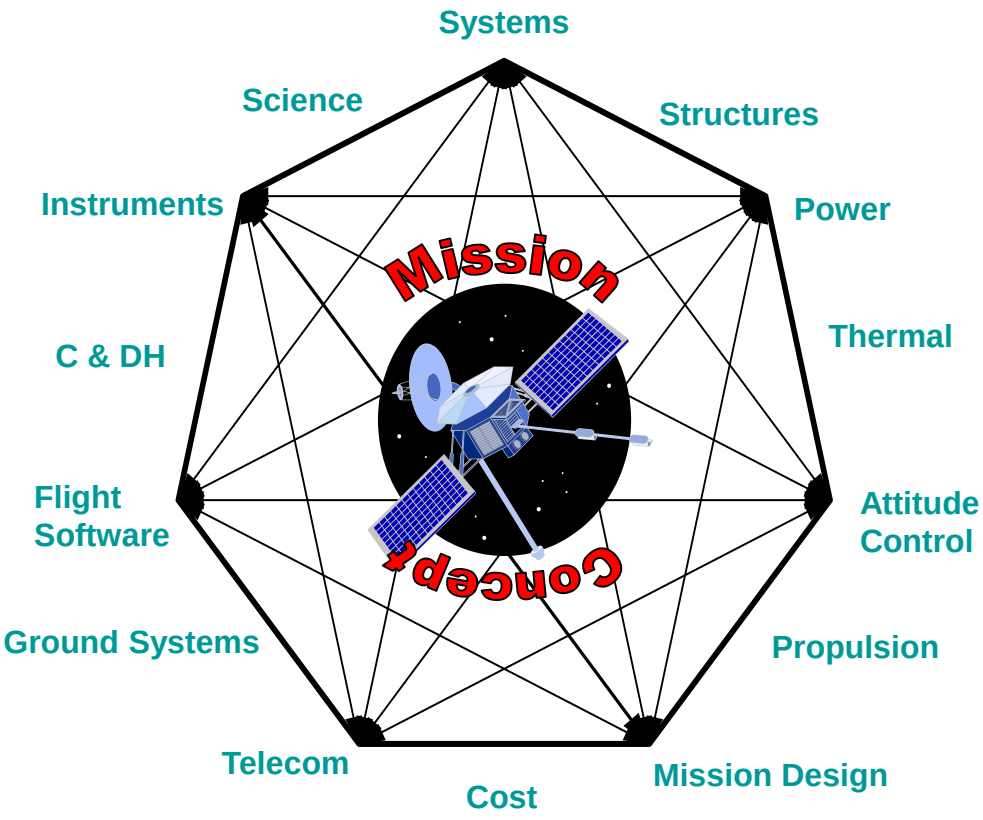
Team X and the NASA Project Life Cycle



How Does Team X Operate?

- **People**
  - About 20 regular “chairs” – each with a lead and at least 2 backups
  - Each represents major subsystems of the spacecraft design
  - Represent the “doing” orgs
  - Usually working on current flight projects too
  - Additional experts are added as needed
- **Tools**
  - Each chair has subsystem sizing tools in Excel and exchange data with a common database through custom VB code
  - Tools are endorsed by the “doing” orgs and selected by the chair leads
  - Some tools currently in use: STK, Institutional Costs Models, Zemax, @RISK, Mathcad, SolidWorks, Unigraphics, and JPL proprietary trajectory and EDL tools
- **Process**
  - Structured process is the framework for the study
    - Products – Team has a set of standard products, but will generate custom products when requested
    - Pre-work – non-concurrent work is started in advance of the study
    - Sessions – 3 hours each. Number and schedule vary depending on the study and products required
    - Post Study – Work is completed after sessions. SEs and Study Lead responsible for report completion.

The Mission Team



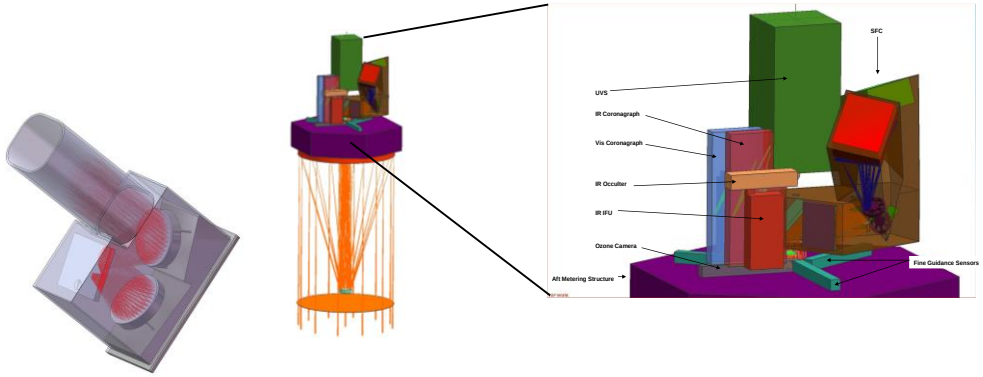
The Instrument Team

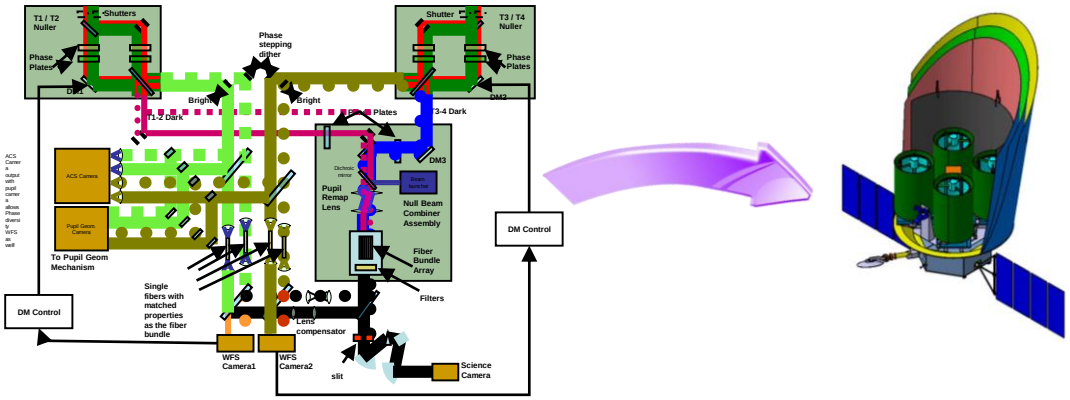
- **Based on the classic Team X paradigm**
  - Fully equipped, maintained and logistically managed PDC facilities
- **Covers the full array of disciplines needed for full concept development**

Studies typically take 1-3 half day concurrent design sessions

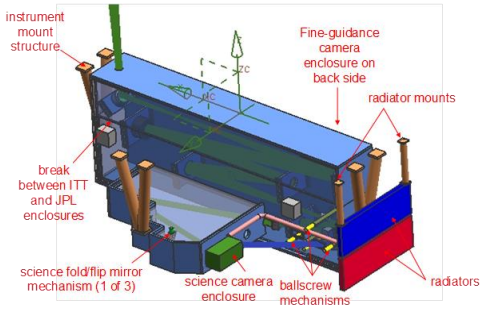
- Concept of operation ⇒
- Detection ⇒
- Data volumes and rates ⇒
- Thermo-mechanical sizing ⇒
- Cost

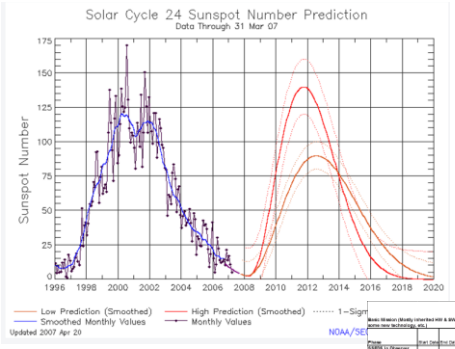
Results can be seamlessly fed into full mission concept studies

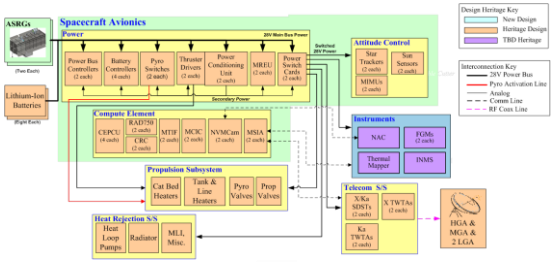


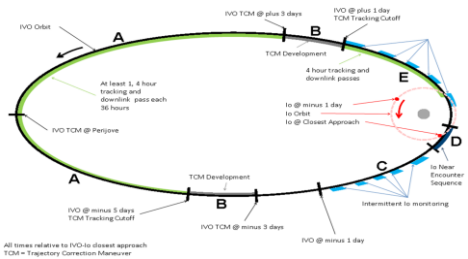


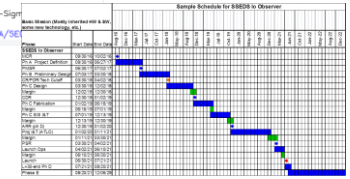
What Does Team X Produce?

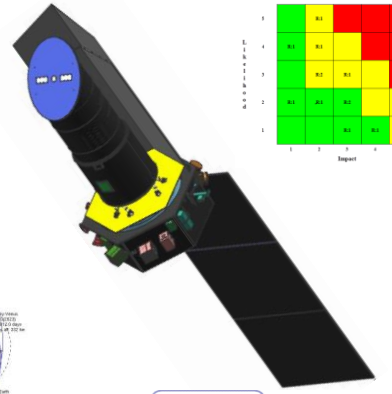


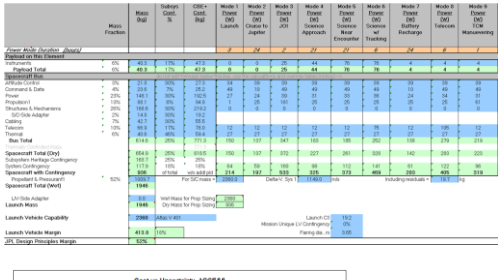


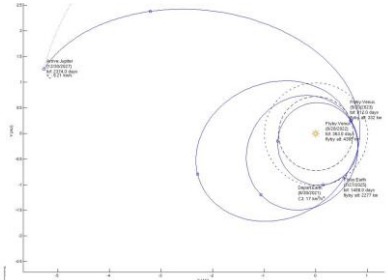


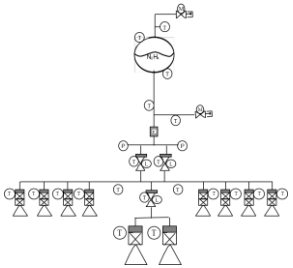


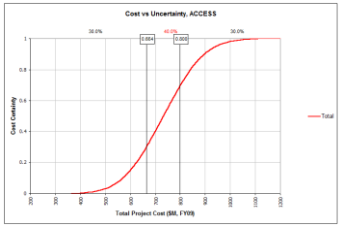


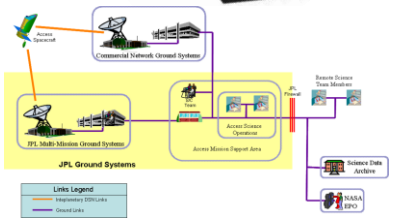


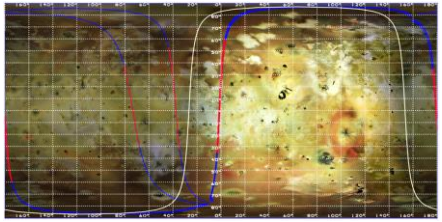




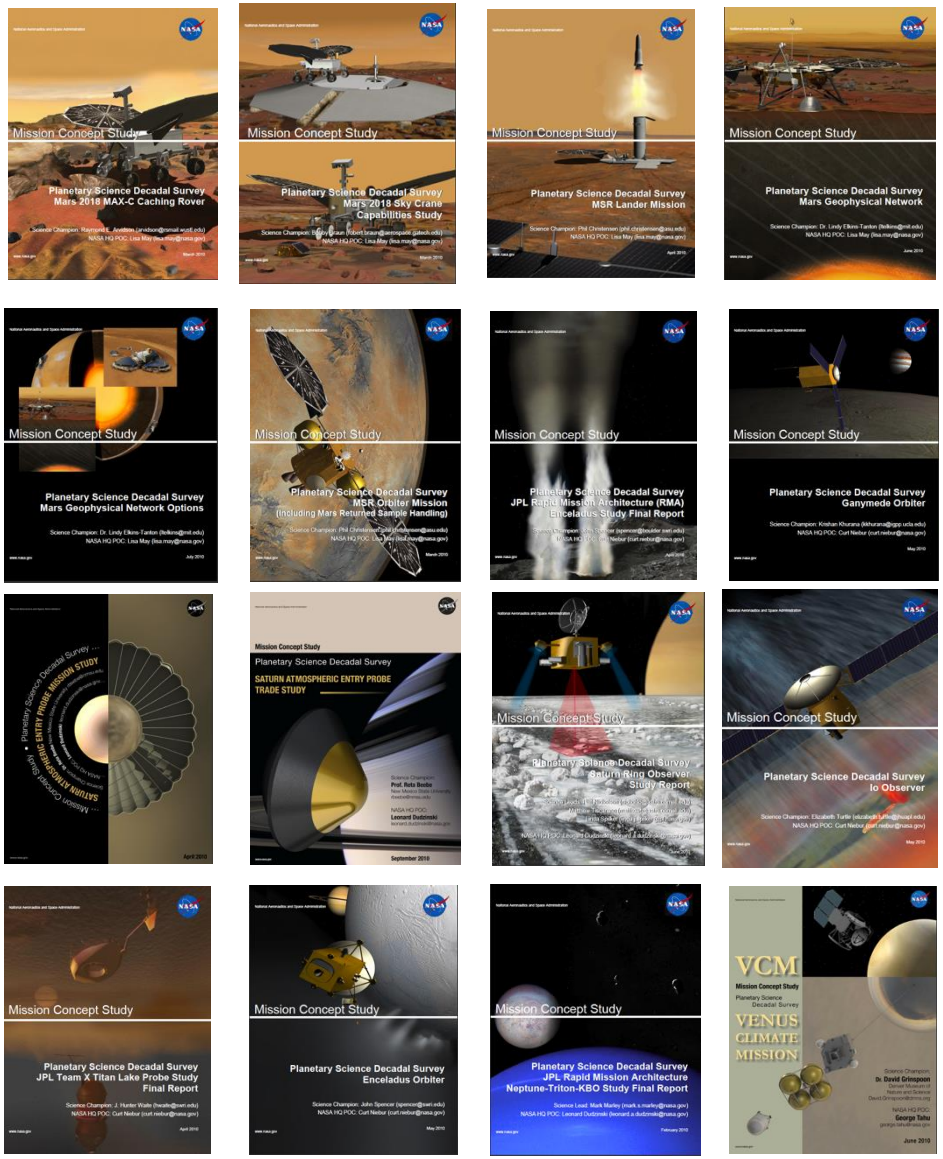








High Visibility Products for NASA



- **Team X supported 16 architecture and mission concepts for Planetary Science Decadal Survey**
- **Team X supported 14 instrument and mission concepts for ASTRO 2010 Decadal Survey**